Claims

1. Vehicle comprising

- a chassis (2),
- at least two first wheels (3) of a first type, which are arranged to support the chassis when resting on the ground and which are each arranged to be rotatable relative to the chassis not only about a first, substantially vertical axis (4), but also about a second axis (5) that constitutes an angle greater than 0° but less than 90° relative to the first axis, whereby each said wheel has a contact surface against the ground that defines a so-called rolling point (6) against this, which is laterally displaced in the horizontal plane relative to the first axis,
- means (8) to individually control the alignment of said wheels relative to the chassis by turning about the first axis,
- means (18) to individually drive said wheels,
- a regulation device (9) to regulate the movements of the vehicle in a horizontal plane,
- a control device (7) with a calculation unit (11) arranged to produce signals to control said control and drive means via information from the regulation device to achieve the movement as instructed by the regulation device,

characterized in that, the regulation device is designed with the capability to, on request of a change of the vehicle's direction in the horizontal plane, order a location for a turning point (B) for the vehicle located anywhere in the horizontal plane, the control device's calculation unit is designed to calculate the instantaneous desired value of respective said first wheel's angular alignment relative to a lengthwise axis of the vehicle corresponding to the location of said turning point as ordered by the regulation device and send signals to the control means so as to achieve that alignment.

2. Vehicle according to claim 1, **characterized** in that, the calculation unit (11) is designed to assume an alignment of said first wheels (3) about the first axis parallel to each other on calculation of the desired value for each wheel's alignment in the horizontal plane for a determined position of the said turning point (B) to determine each wheel's turning about said first axis relative to said parallel alignment.

3. Vehicle according to claim 2, **characterized** in that, the calculation unit (11) is arranged to select the alignment that the vehicle's wheels (3) had as the last parallel alignment before the regulation device's ordering of a said alignment change as the assumed parallel alignment in its calculations.

4. Vehicle according to any if claims 1-3, **characterized** in that, said calculation unit (11) is designed to establish a Cartesian co-ordinate system in the horizontal plane for its calculations with the chassis' centre of rotation (C) as origin and to utilise the co-ordinates for said location of the vehicle's turning point (B) in said co-ordinate system in the calculation of said alignment of each said first wheel (3).

5. Vehicle according to claim 4 and 2 or 3, **characterized** in that, the calculation unit (21) is arranged to designate an axis (x) in said Cartesian co-ordinate system to be directed parallel to said assumed parallel alignment.

6. Vehicle according to any of the preceding claims, **characterized** in that, the control device (7) is arranged to control said wheels via the control means (8) according to the basic principle that they should be mutually parallel-aligned on movement of the vehicle in the horizontal plane with the exception of when a change in the vehicle's direction in the horizontal plane is ordered by the regulation device.

7. Vehicle according to claim 2 or 3, **characterized** in that, the regulation device comprises a first means (12, 12') to order a parallel displacement of the vehicle's steering line (S), meaning the intended line that intersects said turning point (B) and extends perpendicularly to said assumed parallel alignment.

8. Vehicle according to claim 2 or 3, **characterized** in that, the regulation device comprises a second means (15, 15') to displace the turning point (B) ordered by the regulation device along with the instantaneously existing steering line (S) of the vehicle, i.e. the intended line that extends through said turning point and perpendicularly to said assumed parallel alignment.

9. Vehicle according to claim 7 or 8, **characterized** in that, said first and second means are controllable totally independently of one another.

10. Vehicle according to any of the preceding claims, **characterized** in that, the regulation device comprises a third means (16, 16') to set said drive means' (18) direction of the respective first wheels' driving about said second axis.

11. Vehicle according to any preceding claims, **characterized** in that, the regulation device comprises a fourth means (17) to set the velocity of the respective first wheels' (3) rotation about the second axis brought about by the drive means (18).

12. Vehicle according to claim 11, **characterized** in that, the calculation unit (11) is arranged to calculate a suitable rotational velocity of the wheel about its second axis in co-operation with said fourth means (17) for each said first drivable wheel (3) from the wheel's distance from said turning point (B).

13. Vehicle according to any of the preceding claims, **characterized** in that, it comprises means (20) arranged at each of the

vehicle's wheels to sense the wheels' alignment about the first axis relative to the chassis.

14. Vehicle according to any of the preceding claims, **characterized** in that, it comprises means (19) arranged at each of the vehicle's drivable wheels (3) to sense the rotational velocity and direction of rotation about said second axis of the wheel.

15. Vehicle according to claim 13 and/or 14, **characterized** in that, the control device comprises means (21) arranged to compare the result of said sensing with the corresponding desired values ordered via the calculation units calculations, and to correct the control signals to the control means/drive means (8/18) on deviation between said result and desired value.

16. Vehicle according to any of the preceding claims, **characterized** in that, the control device (7) comprise a programmable computer.

17. Vehicle according to any of the preceding claims, **characterized** in that, apart from the two said first wheels (3) it comprises at least one further part (3) arranged to support the chassis and form a third support point for it on the ground, and that said part is formed from a link-wheel or another part with at least the corresponding mobility

18. Vehicle according to claim 17, **characterized** in that, said further part is a said first wheel (3).

19. Vehicle according to claim 17 or 18, **characterized** in that, it comprises two said parts, both constituted of a said first wheel (3).

20. Vehicle according to claim 19, **characterized** in that, the four first wheels (3) are attached to the chassis (2) substantially in each corner of a rectangle in the horizontal plane.

21. Vehicle according to claim 19, **characterized** in that, the two said first wheels (3) are individually drivable and controllable, and the other two first wheels are individually controllable.

22. Method for controlling the movements of a vehicle (1) over the ground on which the vehicles resides, whereby the vehicle comprises a chassis (2), at least two first wheels (3) of a first type, which are arranged to support the chassis when resting on the ground and which are each arranged to be rotatable relative to the chassis not only about a first, substantially vertical axis (4), but also about a second axis (5) that constitutes an angle greater than 0° but less than 90° relative to the first axis, whereby each said wheel has a contact surface against the ground that defines a so called rolling point (6) against this, which is laterally displaced in the horizontal plane relative to the first axis, and a regulation device (9) to control the movements of the vehicle in a horizontal plane, where the alignment of said wheels relative to the chassis is controlled individually by turning the wheel about the first axis, each said wheel is driven individually and, via information from the regulation device, signals are produced by calculation to achieve the movement as instructed by the regulation device,
characterized in that, on request of a change of the vehicle's direction in the horizontal plane, a location for a turning point (B) is ordered via the regulation device for the vehicle with optional location in the horizontal plane, and that for such an ordered location of said turning point (B) for the vehicle the instantaneous desired value corresponding to the location of said turning point is calculated for the respective first wheel's angular alignment relative to a lengthwise axis of the vehicle and the wheels are controlled on the basis thereof.

23. Method according to claim 22, **characterized** in that, the calculation of said desired value for each wheel's (3) alignment in the horizontal axis for a determined location of a said turning

point (B) assumes an alignment of each said first wheel about the first axis parallel to each other to determine a desired value for each wheel's turning about said first axis relative to said parallel alignment.

24. Method according to claim 23, **characterized** in that, on said calculation the alignment that the vehicle's wheels (3) had as the last parallel alignment before the ordering of an alignment change of the vehicle is chosen as the said assumed parallel alignment.

25. Method according to any of claims 22-24, **characterized** in that, on calculation a Cartesian co-ordinate system is established in the horizontal plane with the chassis' centre of rotation (C) as origin and the co-ordinates for said location of the vehicle's turning point (B) in said co-ordinate system is used on calculation of said alignment of each said first wheel.

26. Method according to claim 25 and 23 or 24, **characterized** in that, on calculation an axis (x) is designated to be directed parallel to said assumed parallel alignment in said Cartesian co-ordinate system.

27. Method according to any of claims 22-26, **characterized** in that, said wheels (3) are controlled according to the basic principal that they should be mutually parallel-aligned on movement of the vehicle in the horizontal plane with the exception of when a change in the vehicles direction in the horizontal plane is ordered by the regulation device.

28. Method according to claim 23 or 24 and possibly any of the other preceding method claims, **characterized** in that, the vehicle is controlled by carrying out a parallel displacement of the vehicle's steering line (S), meaning the intended line that intersects said turning point (B) and extends perpendicularly to said assumed parallel alignment.

29. Method according to claim 23 or 24 and possibly any of the other preceding method claims, **characterized** in that, the vehicle is controlled by displacement of the vehicle's turning point along with the instantaneous existing steering line (S) of the vehicles, i.e. the intended line that intersects said turning point (B) and extends perpendicularly to said assumed parallel alignment.

30. Method according to any of claims 22-29, **characterized** in that, the alignment relative to the chassis (2) of each said wheel (3) is sensed and/or the rotational velocity and the direction of rotation about said second axis of each drivable wheel of the vehicle is sensed, and that the results of said sensing is compared with the corresponding desired values produced via said calculation, and on deviation between said results and desired values a control is carried out achieve agreement between the results and the desired values. to correct the control signals to the control means/drive means (8/18)

31. Computer program that is directly loadable into the internal memory of a computer and comprises software means to control the steps according to any of claims 22-30 when the program is run on a computer.

32. Computer program according to claim 31 supplied at least partially via a network such as the Internet.

33. Computer-readable medium with a registered program thereon, which is arranged to cause a computer to control the steps according to any of claims 22-30.